Northeast Fisheries Science Center Reference Document 12-19

New England Harbor Porpoise Bycatch Rates During 2010-2012 Associated with Consequence Closure Areas

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ABSTRACT

The New England component of the Harbor Porpoise Take Reduction Plan (HPTRP) requires bycatch rates to be below HPTRP target bycatch rates in specified areas when averaged over two consecutive management seasons to avoid seasonal closure of Consequence Closure Areas (CCAs). Bycatch rates and HPTRP compliance rates were calculated for the Coastal Gulf of Maine (CGOM) and Southern New England (SNE) CCA-associated areas for the 2011-2012 HPTRP management season and combined with previous estimates from the 2010-2011 season (Orphanides and Palka 2012). Bycatch rates (harbor porpoise per metric ton of landings) during the 2011-2012 season calculated using Northeast Fisheries Observer Program (NEFOP) data were 0.043 (CV=36%) in CGOM and 0.029 in SNE (CV=54%). The resulting two-year average bycatch rates (2010-2012) were 0.057 (CV=25%) in CGOM and 0.020 in SNE (CV=47%). These rates were above the target bycatch rate in CGOM (0.031) and below the target bycatch rate in SNE (0.023). For comparative purposes, bycatch rates were also calculated using a combination of At-Sea Monitor (ASM) data, a data source which began in 2010, and the traditionally used NEFOP data. Joint 2011-2012 NEFOP-ASM bycatch rates were 0.038 (CV= 23%) for CGOM and 0.035 (CV= 46%) for SNE, resulting in two-year bycatch rates of 0.053 (CV= 14%) in CGOM and 0.042 (CV= 32%) in SNE. Compliance with HPTRP pinger regulations was also evaluated. HPTRP pinger compliance (pingers fully deployed and all fully functional) was estimated to be 62.0% in CGOM and 73.2% in SNE.

INTRODUCTION

Since the creation of the Northeast Fisheries Science Center (NEFSC) Northeast Fishery Observer Program (NEFOP) in 1989, harbor porpoise bycatch has been the focus of much attention due to frequently observed incidental takes in commercial gillnet fisheries. In response to high levels of observed harbor porpoise incidental mortality and serious injury, Harbor Porpoise Take Reduction Teams (HPTRTs) were convened for the Gulf of Maine in 1996 and for the Mid-Atlantic in 1997, and were reconvened for both regions combined in 2007. As a result of reconvening the HPTRT in 2007, on February 19, 2010 NMFS published the 2010 HPTRP (75 FR 7383) to address both non-compliance with existing HPTRP requirements and bycatch that was occurring outside of existing HPTRP management areas. One of the key new components in the 2010 HPTRP that was developed to address non-compliance in areas with historically high levels of bycatch was the Consequence Closure Area (CCA) strategy. This strategy involves three potential seasonal closure areas, which are referred to as CCAs. Under this strategy, if the average bycatch rate within two consecutive management seasons in a "CCA-associated area" exceeds a specified target bycatch rate, then a seasonal closure of the CCA is triggered. These target bycatch rates were set to match previously observed bycatch rates within CCA-associated areas on NEFOP-observed hauls with full pinger deployment that were observed between January 1, 1999 and May 31, 2007 (Palka and Orphanides, 2008).

CCA-associated areas encompass CCAs and are composed of existing Management Areas (MAs). The Coastal Gulf of Maine (CGOM) CCA-associated area is composed of the Mid-Coast, Stellwagen Bank, and Massachusetts Bay MAs (Figure 1), which also include the CGOM CCA (Figure 2). The target bycatch rate for the CGOM CCA-associated area is 0.031 harbor porpoise per metric ton of landings; if that rate is exceeded after two consecutive management seasons, the CGOM CCA becomes seasonally closed under the 2010 HPTRP. The

Southern New England (SNE) CCA-associated area is the Southern New England MA (Figure 1), which includes the Eastern Cape Cod CCA and the Cape Cod South Expansion CCA (Figure 2). The target bycatch rate for the SNE CCA is 0.023 harbor porpoise per metric ton of landings, and if that rate is exceeded after two consecutive management seasons, both the Eastern Cape Cod and Cape Cod South Expansion CCAs become seasonally closed. For details on the time period each MA is either seasonally closed to gillnet fishing or requires the use of pingers, see Figure 1.

The first management season under the 2010 HPTRP CCA strategy was the 2010-2011 HPTRP management season, which was from Sept 15, 2010 to May 31, 2011. CCA bycatch rates and compliance with the pinger requirements for that season were documented in Orphanides and Palka (2012). The current report provides a similar update for the second HPTRP management season (Sept 15, 2011 to May 31, 2012). This report also provides the first two-year average bycatch rates for each CCA.

METHODS

Data

The NEFOP data and At-Sea-Monitor (ASM) data were used to calculate bycatch and compliance rates. The NEFSC NEFOP was initiated in 1989 to document the bycatch of marine mammals taken incidentally in commercial fishing operations (Waring et al. 2004). Its role has since expanded to monitor commercial fishing from Maine through North Carolina, collecting, maintaining, and distributing data for scientific and management purposes. To achieve these and other goals, NEFOP collects data on landed and discarded catch, numerous fishing vessel and gear characteristics, and many other variables. For additional details on the data collected, see the NEFOP Fisheries Observer Program Manual for 2010 at http://www.nefsc.noaa.gov/fsb.

The ASM program was established in response to Amendment 16 of the Northeast Multispecies Fishery Management Plan (FMP) to monitor catch and discards in the large mesh portion of this fishery, often referred to as the "groundfish" fishery. Specifically, ASM data are used to monitor Annual Catch Entitlements (ACE) and Annual Catch Limits (ACL) of each stock managed by the FMP as of May 1, 2010 and to verify area fished as well as catch and discards by species and gear type (NOAA Fisheries 2011, 15 CFR Part 902, 50 CFR Part 648). When using the ASM data for calculating harbor porpoise bycatch rates, care was taken to combine the ASM data with NEFOP data in a manner that ensured the final sample was representative of the groundfish/non-groundfish (i.e., Northeast Multispecies fishery/other fisheries) distribution in the NEFOP data (see Bycatch Rates section of the Methods below for more details). For complete information on the fields collected in ASM see the ASM Program Manual at http://www.nefsc.noaa.gov/fsb, and for additional background on ASM data and the relationship between NEFOP and ASM data see Orphanides and Palka (2012).

The 2011-2012 datasets (NEFOP and ASM) were processed using standard protocols established for past bycatch and compliance calculations (e.g., Orphanides 2011; Orphanides and Palka 2012). Specifically, the 2011-2012 recorded dressed landed weights were converted to live weights using established conversion factors (Warden and Orphanides 2008; Palmer 2010) and rare missing location values were imputed using medians from representative strata using methods described in Warden and Orphanides (2008). For the 2011-2012 data, original location values were present in over 99% of SNE and CGOM hauls, and no incidental harbor porpoise takes were associated with imputed locations in CCA-associated areas. One NEFOP haul was

located on the border of the SNE and Massachusetts Bay MAs. This haul was counted as only being located in the SNE MA since most other hauls on that trip occurred in the SNE MA and none occurred in the Massachusetts Bay MA.

Bycatch Rates

Bycatch rates were calculated as the number of observed harbor porpoise incidental takes per observed metric tons (mtons) of live fish landed. All bycatch rates discussed in this report can be assumed to be in terms of harbor porpoise incidental takes per metric tons of live fish landed. A harbor porpoise incidental take was defined as any observed incidentally caught harbor porpoise that was recorded as either alive or dead. In some cases, it was possible that a decomposed harbor porpoise could be an animal that was dead prior to being entangled in a gillnet. Therefore, if an incidental take was recorded as being either moderately or severely decomposed when incidentally caught, the gear's soak duration was examined to see if the incidental take could have reached the recorded state of decomposition within the given soak time, i.e., whether the harbor porpoise could have been alive when entangled in the net. No harbor porpoise were excluded due to decomposition status in the 2011-2012 season.

When calculating bycatch rates using only the NEFOP data (NEFOP Byc_{CCA}), the number of harbor porpoise observed incidentally taken in a CCA associated time-area (NEFOP Observed $\text{Takes}_{\text{CCA}}$) was divided by the amount of effort (metric tons of live fish landed) in the corresponding CCA associated time-area (NEFOP Observed $\text{Effort}_{\text{CCA}}$):

$$\text{NEFOP Byc}_{\text{CCA}} = \text{NEFOP Observed Takes}_{\text{CCA}} / \text{NEFOP Observed Effort}_{\text{CCA}}$$

Calculating bycatch rates using NEFOP and ASM data (Joint NEFOP ASM Byc_{CCA}) was slightly more complicated because it was necessary to account for the fact that the ASM data were the result of a higher observer coverage as compared to the NEFOP data and the ASM data were only recorded from groundfish trips:

$$\text{Joint NEFOP ASM Byc}_{\text{CCA}} = (\text{Groundfish\%}_{\text{CCA}} * \text{GroundfishByc}_{\text{CCA}}) + (\text{NonGroundfish\%}_{\text{CCA}} * \text{NonGroundfishByc}_{\text{CCA}})$$

The ASM data are by definition a subset of the entire gillnet fishery as it is designed to only sample groundfish trips. In contrast, the NEFOP data are designed to be a sample of the entire gillnet fishery. When calculating the joint NEFOP-ASM bycatch rates, NEFOP data were separated into groundfish and non-groundfish trip types using the NEFOP sector id code (NOAA Fisheries 2010). The NEFOP groundfish trips were then pooled with the ASM groundfish trips and used to calculate a groundfish bycatch rate for each CCA associated time-area ($\text{GroundfishByc}_{\text{CCA}}$). Similarly, non-groundfish NEFOP data were used to calculate a non-groundfish bycatch rate for each CCA associated time-area ($\text{NonGroundfishByc}_{\text{CCA}}$). Next, steps were taken to preserve the groundfish/non-groundfish ratio of the NEFOP data and retain consistency with how the target bycatch rates were originally calculated from only NEFOP data. The percentage of landings from the two trip types (groundfish and non-groundfish) was recorded for each CCA associated time-area ($\text{Groundfish\%}_{\text{CCA}}$ and $\text{NonGroundfish\%}_{\text{CCA}}$). These percentages were then used to weight the groundfish and non-groundfish bycatch rates. Thus, the weighted groundfish bycatch rate had an influence proportional to the percentage of groundfish trip landings in the NEFOP data.

Once the NEFOP-only and joint NEFOP-ASM bycatch rates for 2010-2011 and 2011-2012 HPTRP management seasons were calculated, two-year average bycatch rates were calculated using a weighted average of the estimates from those two management seasons, or "years," as described in Palka and Orphanides (2008). The two year average is weighted by the number of observed hauls in each HPTRP management season.

$$\text{2 Yr Weighted Avg Byc Rate} =$$

$$\frac{\text{Yr1 Byc Rate} * \text{Yr1 N of Obs Hauls} + \text{Yr2 Byc Rate} * \text{Yr2 N of Obs Hauls}}{\text{Yr1 Observed Hauls} + \text{Yr2 Observed Hauls}}$$

For both the NEFOP-only bycatch rates and the joint NEFOP-ASM bycatch rates, the number of observed hauls in the NEFOP data was used to weight the two year average. For the joint NEFOP-ASM two-year bycatch rates, weighting with only NEFOP hauls was done to keep the ASM groundfish hauls from having a disproportionate influence on the final bycatch rates.

Standard bootstrapping techniques were used to derive the coefficients of variation (CV) and 95% confidence intervals (CIs) for the bycatch estimates for each 2011-2012 stratum, as has been done for past bycatch estimates (e.g., Orphanides and Palka 2012). Also consistent with past estimates, the re-sampling unit used was an entire trip rather than an individual haul to ensure that any trip-based characteristics that might influence bycatch rates were carried over into the estimated CV (Bisack 2003). The two HPTRP season bycatch rates and their associated CVs were used to derive the two-year bycatch rate CVs using the following equation:

$$\text{CV (2 Yr Weighted Avg Byc Rate)} =$$

$$\frac{\sqrt{((\text{Yr1 Weight}^2) * \text{var(Yr1 Byc Rate)}) + ((\text{Yr2 Weight}^2) * \text{var(Yr2 Byc Rate)})}}{\text{2 Yr Weighted Avg Byc Rate}}$$

where

$$\text{Yr1 Weight} = \frac{\text{Yr1 N Obs Hauls}}{\text{Yr1 N Obs Hauls} + \text{Yr2 N Obs Hauls}}$$

$$\text{Yr2 Weight} = \frac{\text{Yr2 N Obs Hauls}}{\text{Yr1 N Obs Hauls} + \text{Yr2 N Obs Hauls}}$$

and

$$\text{var(Yr1 Byc Rate)} = (\text{Yr1 Byc Rate} * \text{CV(Yr1 Byc Rate)})^2$$

$$\text{var(Yr2 Byc Rate)} = (\text{Yr2 Byc Rate} * \text{CV(Yr2 Byc Rate)})^2$$

2011-2012 Pinger Compliance Rates

During times and areas where pingers are required in the New England gillnet fisheries, the 2010 HPTRP requires that each gillnet string has one functioning pinger on each end of the string, and one functioning pinger in between each net. For example, a typical gillnet string with

10 300-foot long nets is required to have 11 functioning pingers on the string. In the past, the measure of compliance was often calculated based only on whether a gillnet haul had the proper number of pingers on the string because the functionality of the pingers was not regularly recorded by NEFOP (Palka et al. 2008, Orphanides et al. 2009). Use of the proper number of pingers on a string, regardless of whether the pinger is working, will be referred to here as full pinger deployment.

Recently, NEFOP developed a new pinger tester that was deployed on a limited sample of NEFOP trips during 2011 and 2012 (none deployed on ASM trips). On those trips, the aim was to test all of the pingers on each string to determine if they were functioning properly. Pinger tester data from hauls with full pinger deployment were used to assess the true pinger compliance rate; that is, the number of tested hauls with both full pinger deployment and all pingers functional were divided by the number of tested hauls with full pinger deployment. The resulting number was the percent of hauls with fully deployed pingers that also had all pingers functioning. This percentage was then applied to the percentage of all NEFOP observed hauls with full pinger deployment (whether tested for pinger functionality or not) to estimate the true pinger compliance rate. For additional details on how pinger tester data were recorded, see Orphanides and Palka (2012). Compliance with HPTRP pinger regulations was assessed using only NEFOP data to be consistent with the previous year's CCA analysis (Orphanides and Palka 2012), and because pinger tester data were only collected on NEFOP hauls. However, full pinger deployment was also summarized for ASM data.

RESULTS

The spatial distributions of the observed hauls and harbor porpoise takes collected by the NEFOP and ASM programs are similar (Figures 3 and 4). Between the NEFOP and ASM data 21 harbor porpoise were observed incidentally taken in CGOM CCA-associated areas and 8 were observed incidentally taken in SNE (Table 1). In CGOM the observed bycatch rates were above the target bycatch rate (0.031) in all cases (Table 2). The 2011-2012 CGOM bycatch rate was above the target when using NEFOP data (0.043, CV=36%) and when using the joint NEFOP-ASM data (0.038, CV=23%). The larger sample size of observed hauls in the joint NEFOP-ASM bycatch rate resulted in an increased level of confidence, and a lower CV. The two-year weighted average bycatch rates were also above the targets: 0.057 (CV=25%) for NEFOP and 0.053 for NEFOP-ASM (CV=14%) (Table 2).

In the 2011-2012 season, the SNE observed bycatch rates (0.029 for NEFOP, CV=54%, and 0.035 for NEFOP-ASM, CV = 46%) were above the SNE target bycatch rate (0.023) (Table 2). However, the two-year weighted average bycatch rate for SNE was below the target bycatch rate when using NEFOP data (0.020, CV = 47%) and above the target when using joint NEFOP-ASM data (0.042, CV=32%).

Compliance with pinger regulations was estimated at 62% in CGOM and 73% in SNE. Full pinger deployment occurred on 80% of observed hauls in CGOM and 73% of hauls in SNE (Table 3). However, among CGOM hauls with full pinger deployment also tested for pinger functionality, about 23% did not have all pingers functioning. In SNE all tested pingers on hauls with full pinger deployment were functional, though the sample size was much smaller than in CGOM.

DISCUSSION

In this paper two sets of CCA bycatch rates were calculated. One set was calculated using only NEFOP data, and the other set was calculated using both NEFOP and ASM data. For the 2010-2011 HPTRP season, NOAA Fisheries Northeast Regional Office (NERO) decided to use NEFOP bycatch rates to evaluate bycatch rates within CCA-associated areas in order to maintain consistency with how the original CCA target bycatch rates were calculated. Compared to the 2010-2011 HPTRP season, the NEFOP 2011-2012 bycatch rates were lower in CGOM, but higher in SNE. Based on year one CCA data (2010-2011), it was determined that the bycatch rate in the CGOM CCA was too high to avoid a closure even if no harbor porpoise were caught in year two (2011-2012). This assertion proved correct, as the combined NEFOP two-year average bycatch rate was 0.057 (CV=25%) in CGOM, well above the 0.031 target. The corresponding two-year average bycatch rate in SNE was 0.020 (CV=47%), slightly below the target rate of 0.023.

In CGOM, the two-year bycatch rates were very comparable when calculated using NEFOP data (0.057, CV=25%) and when using joint NEFOP-ASM data (0.053, CV=14%). However, in SNE the two-year bycatch rates differed greatly between NEFOP data (0.020, CV=47%) and joint NEFOP-ASM data (0.042, 32%). The difference in rates between data sources is likely associated with sample size combined with the variability of observing a rare event like an incidental harbor porpoise take. The sample size of observed hauls (and landings) in SNE was smaller than in CGOM, whether looking at NEFOP, ASM, or joint datasets (Tables 1 and 2). Further, the sample size of hauls (and landings) in NEFOP data in SNE was much smaller than the sample size of ASM data in the region. Differences in the vessels sampled and their manner of fishing between NEFOP and ASM data could also contribute to the differences between these rates. An investigation comparing NEFOP and ASM data is currently underway.

The two-year bycatch rates calculated using joint NEFOP-ASM data were weighted using only the NEFOP hauls, though one might expect that both NEFOP and ASM hauls would be used to weight this bycatch rate. In this case, only NEFOP hauls were used so that the ASM groundfish hauls would not have a disproportionate effect on the final bycatch rates. However, one could argue that since ASM hauls were used to calculate the single-year bycatch rates, they should be used for the two-year rates as well. The best solution may be to use, but somehow down-weight, the number of ASM hauls in the weighting process when calculating the two-year average bycatch rate. But, in practice, weighting the two-year bycatch rate using both the ASM and NEFOP hauls made little difference in either the final two-year bycatch rate or CV. In a post-hoc analysis using both NEFOP and ASM hauls to weight the two-year bycatch rates, the CVs of neither region differed from when only NEFOP hauls were used to weight the two-year bycatch rates, and the bycatch rates shifted from 0.057 to 0.054 in CGOM and 0.040 to 0.042 in SNE.

It is possible that the high two-year bycatch rate in CGOM was due, at least in part, to a mixture of working and non-working pingers on the hauls with fully deployed pingers. Research in this fishery has shown that bycatch rates for hauls without pingers has been two to three times the rates of hauls with pingers (Palka et al. 2008). In addition, that study showed that hauls with insufficient numbers of pingers can have higher bycatch rates than hauls with the required number of pingers; however, the reason for this is not clear. Pinger functionality analysis found that roughly 80% of hauls in 2011-2012 with fully deployed pingers that were tested for functionality had all pingers functioning, compared to roughly 62% in 2010-2011 (Orphanides

and Palka 2012). The problem of non-functioning pingers has been consistent throughout this fishery, and it makes it challenging to assess the true capability of pingers to deter harbor porpoise within this fishery (Palka et al. 2008, Orphanides et al. 2009, Orphanides et al. 2010, Orphanides and Palka 2012). Other possible reasons for high bycatch rates may include shifts in fishing effort or harbor porpoise distributions, though these have not been investigated in this report. The most likely cause of high bycatch rates in CGOM is the low pinger compliance rates, though more data is needed to confirm the effect of missing or non-functional pingers on a string.

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REFERENCES CITED

Bisack KD. 2003. Estimates of marine mammal bycatch in the Northeast (New England) multispecies sink gillnet fishery in 1996. US Dep Commer, Northeast Fish Sci Cent Ref Doc. 03-18; 18 p. Available from: NOAA Fisheries, 166 Water St, Woods Hole MA 02543-1026 or http://www.nefsc.noaa.gov/nefsc/publications/

NOAA Fisheries. 2010. Northeast Fisheries Observer Program Fisheries Observer Program Manual 2010. Available from: U.S. Dept. of Commerce/NOAA Fisheries Service, National Marine Fisheries Service, Northeast Fisheries Science Center, Fisheries Sampling Branch, 166 Water Street, Woods Hole, MA 02543 or http://www.nefsc.noaa.gov/fsb

NOAA Fisheries. 2011. At-Sea-Monitoring Program Manual. 06/11. Available from: U.S. Dept. of Commerce/NOAA Fisheries Service, National Marine Fisheries Service, Northeast Fisheries Science Center, Fisheries Sampling Branch, 166 Water Street, Woods Hole, MA 02543 or http://www.nefsc.noaa.gov/fsb

Orphanides CD, Wetmore S, Johnson A. 2009. Update on Harbor Porpoise Take Reduction Plan Monitoring Initiatives: Compliance and Consequential Bycatch Rates from June 2007 through May 2008, Pinger Tester Development and Enforcement from January 2008 through July of 2009. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 09-14; 16 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026 or http://www.nefsc.noaa.gov/publications/

Orphanides CD. 2010. Update on Harbor Porpoise Take Reduction Plan Monitoring Initiatives: Compliance and Consequential Bycatch Rates from June 2008 through May 2009. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://www.nefsc.noaa.gov/nefsc/publications/

Orphanides CD. 2011. Estimates of Cetacean and Pinniped Bycatch in the 2009 New England Sink Gillnet and Mid-Atlantic Gillnet Fisheries. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 11-08; 28 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://www.nefsc.noaa.gov/nefsc/publications/

Orphanides CD, Palka D. 2012. 2010-2011 HPTRP Consequential Bycatch and Compliance Rates. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 12-08; 25 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://www.nefsc.noaa.gov/nefsc/publications/

Palka DL, Orphanides CD. 2008. Harbor porpoise bycatch rates that indicate compliance with pinger regulations for the Northeast gillnet fishery. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 08-10; 13 p., 166 Water Street, Woods Hole, MA 02543-1026, or online at http://www.nefsc.noaa.gov/nefsc/publications/

Palka DL, Rossman, MC, VanAtten, AS, and CD Orphanides. 2008. Effect of pingers on harbour porpoise bycatch in the US northeast gillnet fishery. J. Cetacean Res. Manage. 10(3):217-226.

Palmer MC. 2010. A standard method to apportion groundfish catch to stock area for the purpose of real time quota monitoring under Amendment 16. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 10-02; 32 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://nefsc.noaa.gov/publications/.

Warden ML, Orphanides CD. 2008. Preparation of the Northeast Fisheries Observer Program gillnet data for use in bycatch analyses of protected species. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 08-17; 44 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026 or http://www.nefsc.noaa.gov/publications/

Waring GT, Pace RM, Quintal JM, Fairfield CP, Maze-Foley K, Editors. 2004. US Atlantic and Gulf of Mexico marine mammal stock assessments -- 2003. US Dep Commer, NOAA Tech Memo NMFS NE 182; 287 p. Available from: NOAA Fisheries, 166 Water St, Woods Hole MA 02543-1026 or http://www.nefsc.noaa.gov/nefsc/publications/

Table 1. Observed incidentally taken harbor porpoise, landings, trips, and percent Northeast Fishery Observer Program (NEFOP) groundfish trip landings by Consequence Closure Area (CCA)-associated-area in the New England gillnet fishery for the 2011-2012 HPTRP management season.

CCA-Associated Area	Total Harbor Porpoise (harbor porpoise on groundfish hauls)		Total Trips		Total Landings in mtons (groundfish landings in mtons)		NEFOP Percent Groundfish Trip Landings
	NEFOP	ASM	NEFOP	ASM	NEFOP	ASM	
Coastal Gulf of Maine	8 (8)	13 (13)	277	741	188.12 (187.21)	437.64 (437.64)	99.52%
Southern New England	3 (0)	5 (5)	37	175	104.60 (62.78)	361.52 (361.52)	60.00%

Table 2. Bycatch rates, coefficients of variations (CVs), and hauls by Consequence Closure Area (CCA)-associated area in the New England gillnet fishery for the 2010-2011 (year 1), 2011-2012 (year 2), and combined 2010-2012 Harbor Porpoise Take Reduction Plan (HPTRP) management seasons.

CCA-Associated Area	Data Source(s)	Year 1 Bycatch rate (CV, Observed Hauls)	Year 2 Bycatch Rate (CV, Observed Hauls)	2-Year Weighted Average Bycatch Rate (CV)	HPTRP Target Bycatch Rate
Coastal Gulf of Maine	NEFOP	0.078 (34%, 883)	0.043 (36%, 1265)	0.057 (25%)	0.031
Coastal Gulf of Maine	NEFOP-ASM	0.074 (18%, 2589)	0.038 (23%, 3339)	0.053 (14%)	0.031
Southern New England	NEFOP	0.012 (96%, 238)	0.029 (54%, 205)	0.020 (47%)	0.023
Southern New England	NEFOP-ASM	0.048 (43%, 651)	0.035 (46%, 925)	0.042 (32%)	0.023

Table 3. Estimated Harbor Porpoise Take Reduction Plan (HPTRP) pinger compliance in the New England gillnet fishery during the 2011-2012 HPTRP management season.

CCA-Associated Area	Data Source	Full pinger deployment hauls	Non-Full Pinger Deployment Hauls	Total Observed Hauls	Full Pinger Deployment Percentage	Recorded Hauls (and Trips) Tested for Pinger Functionality	Full Pinger Deployment Hauls (and Trips) Tested for Pinger Functionality	Functionality on Full Pinger Deployment Hauls	Percent Compliant Estimate
Coastal Gulf of Maine	NEFOP	1012	253	1265	80.00%	214 (56)	120 (38)	77.50%	62.00%
Coastal Gulf of Maine	ASM	1647	427	2074	79.41%	0	0	NA	NA
Southern New England	NEFOP	150	55	205	73.17%	12 (3)	10 (3)	100.00%	73.17%
Southern New England	ASM	578	142	720	80.28%	0	0	NA	NA

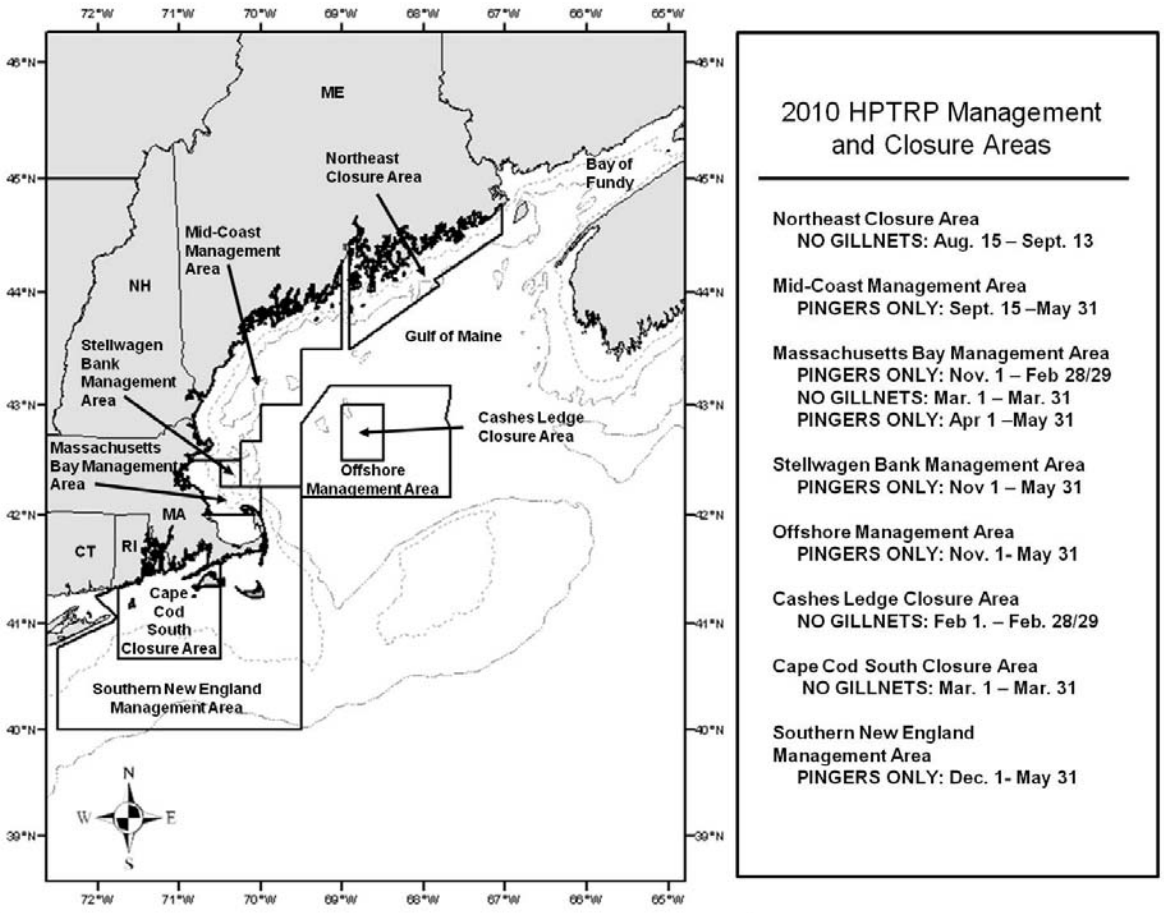

Figure 1. Harbor Porpoise Take Reduction Plan (HPTRP) New England gillnet management and closure areas.

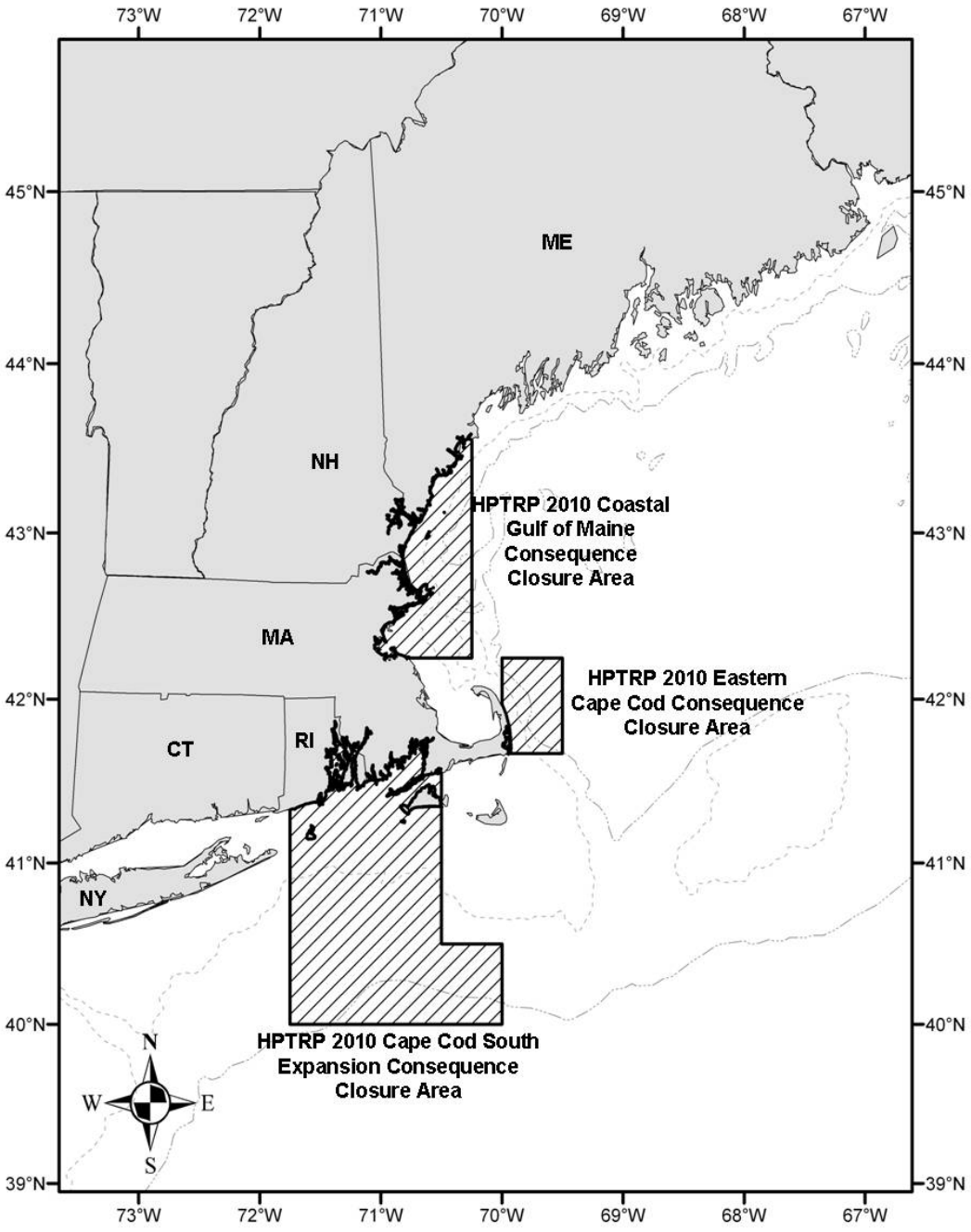

Figure 2. Harbor Porpoise Take Reduction Plan (HPTRP) New England gillnet Consequence Closure Areas (CCAs).

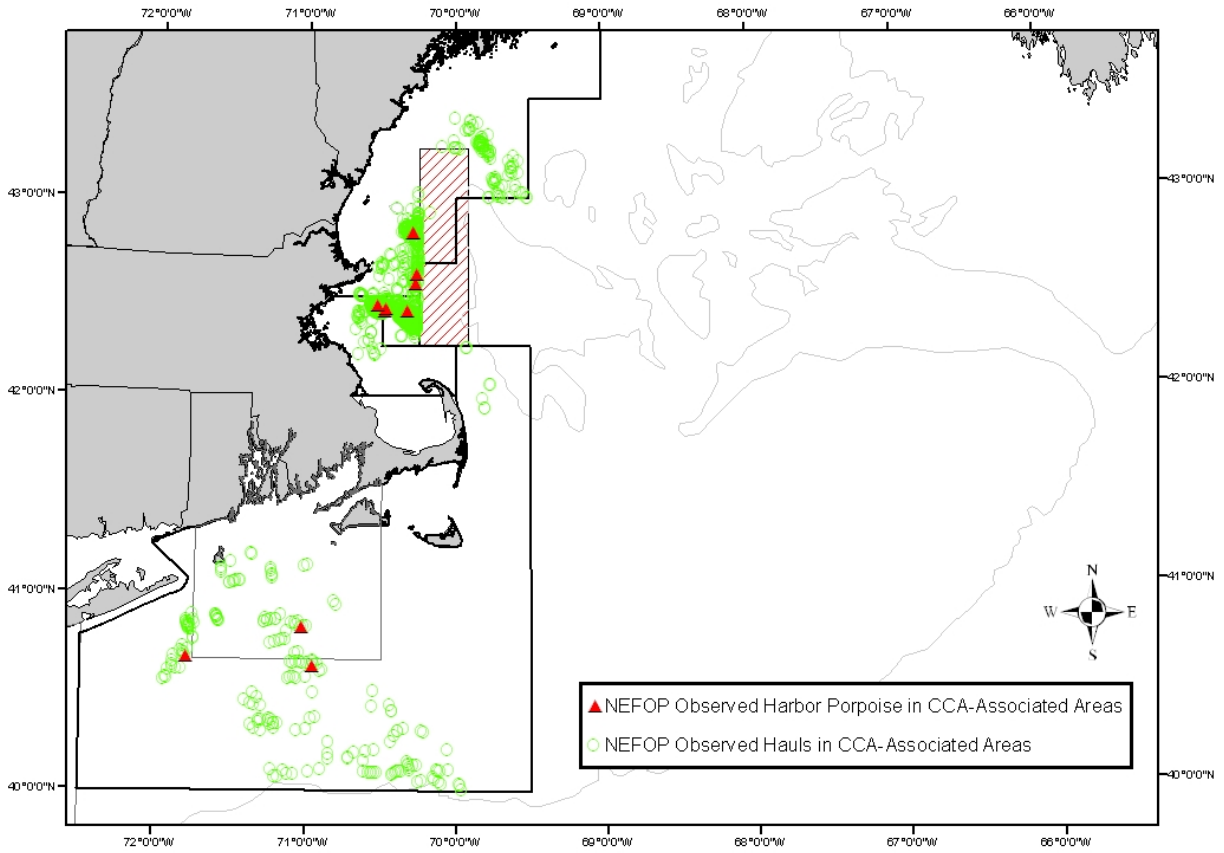

Figure 3. Northeast Fishery Observer Program (NEFOP) observed gillnet hauls and harbor porpoise bycatch locations for the 2011-2012 Harbor Porpoise Take Reduction Plan (HPTRP) management season. Hatched area represents the year-round Western Gulf of Maine Closure Area under the Northeast Multispecies Fishery Management Plan (FMP). For a corresponding figure for the 2010-2011 season, see Orphanides and Palka (2012).

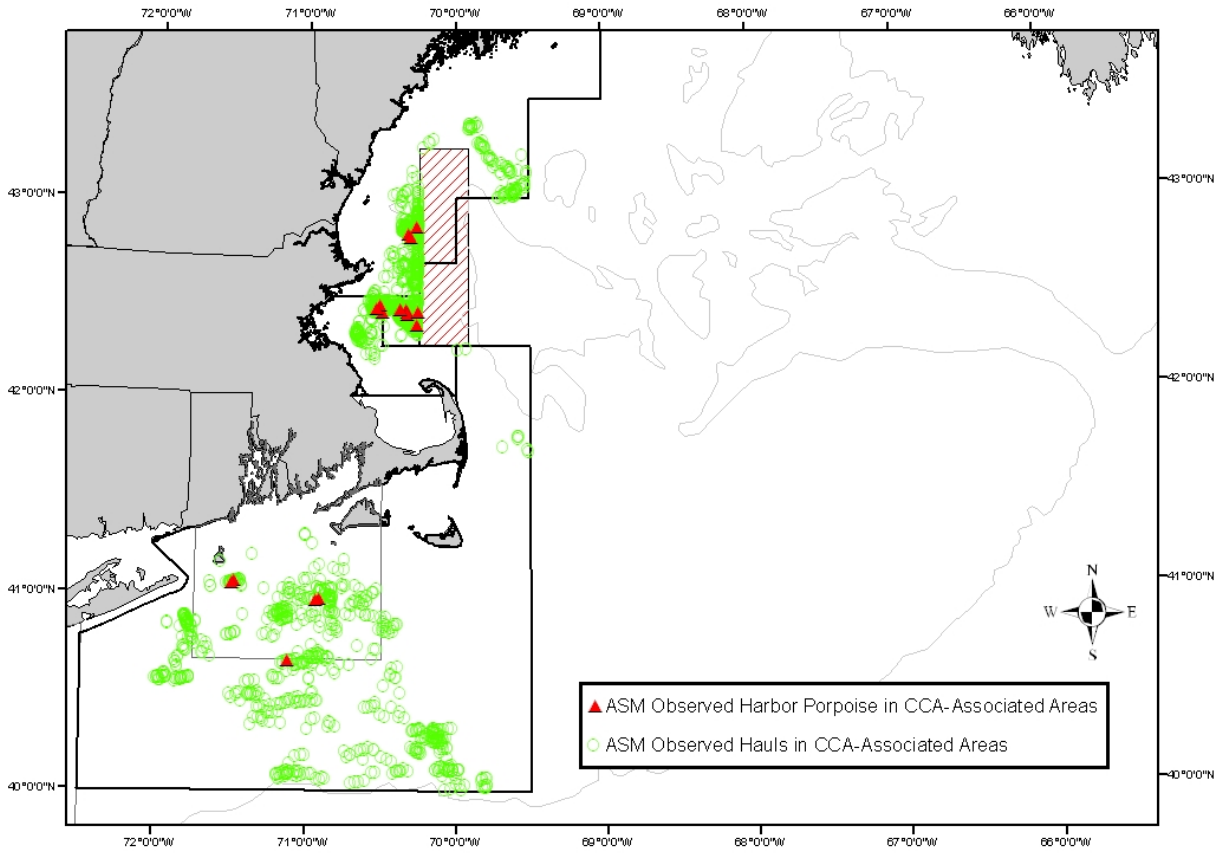

Figure 4. At-Sea-Monitor (ASM) observed gillnet hauls and harbor porpoise bycatch locations for the 2011-2012 Harbor Porpoise Take Reduction Plan (HPTRP) management season. Hatched area represents the year-round Western Gulf of Maine Closure Area under the Northeast Multispecies Fishery Management Plan (FMP). For a corresponding figure for the 2010-2011 season, see Orphanides and Palka (2012).

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